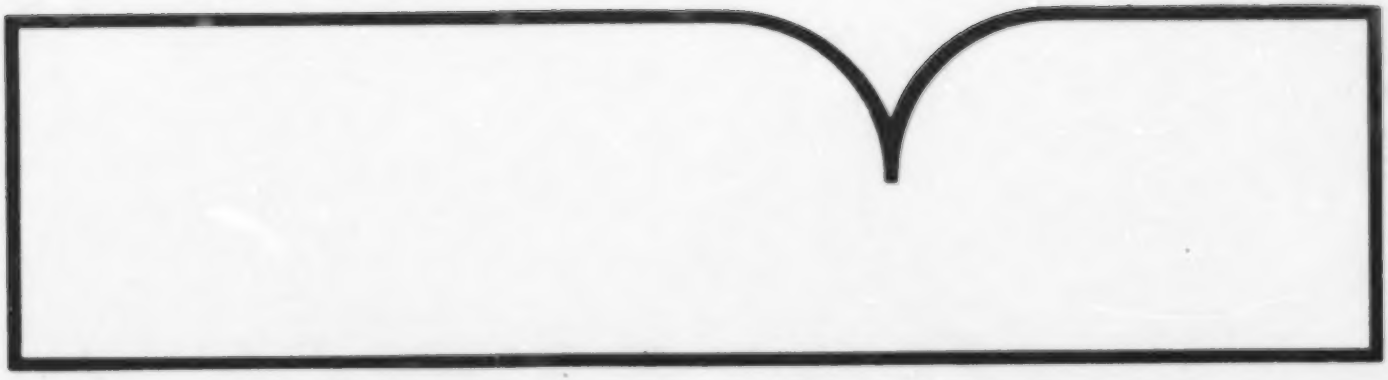
PB85-225514

Superfund Record of Decision (EPA Region 1)
Sylvester Site, Nashua, New Hampshire
September 1983 (Supplement to July 29, 1982 ROD)

(U.S.) Environmental Protection Agency
Washington, DC

22 Sep 83



U.S. Department of Commerce
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United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/RO1-83/007
September 1983

PB85-225514

EPA

Superfund Record of Decision:

Sylvester Site, NH
(Supplement to 07/29/82 ROD)

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TECHNICAL REPORT DATA
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1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
		PB85 225514/AS

4. TITLE AND SUBTITLE	5. REPORT DATE
SUPERFUND RECORD OF DECISION: Sylvester, NH (Supplemental ROD)	09/22/83
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U. S. Environmental Protection Agency 401 "M" Street, S. W. Washington, D. C. 20460	13. TYPE OF REPORT AND PERIOD COVERED
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Gilson Road hazardous waste dump site is located in the City of Nashua, New Hampshire. The 6-acre site has been used as a sand borrow pit for an undetermined number of years. Some time during the late 1960's the operator of the pit began an unapproved and illegal waste disposal operation. Household refuse, demolition materials, chemical sludges, and approximately 800,000 gallons of hazardous liquid chemicals were dumped at the site. The ground water, air and to a lesser extent surface water have been contaminated.

The original ROD was signed in July 1982 approving the installation of a slurry wall and surface cap as the first operable unit. The ROD also approved ground water treatment as the second operable unit but deferred selection of the specific treatment process until the technical analysis and evaluation of the pilot plant studies were complete. The cost-effective ground water treatment system selected for this site includes: inorganic chemicals removal; volatile organic chemicals removal; concentrated organic chemicals removal; and biological treatment of the sidestream. Also a treatment rate of 300 gpm has been selected to reduce the operating time to approximately 2 years.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Site Name: Sylvester, NH (Supplemental ROD) Contaminated media: gw, sw, air Key contaminants: volatile organics, inorganics, heavy metals		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
	None	19
	20. SECURITY CLASS (This page)	22. PRICE
	None	

Supplemental Record of Decision
Ground Water Treatment Alternative Selection

Site: Sylvester Site, Gilson Road, Nashua, New Hampshire

Analyses Reviewed:

I have reviewed the following documents describing the analysis of cost effectiveness of remedial alternatives at the Sylvester Site:

-AA OSWER Record of Decision on Remedial Alternative Selection for the Sylvester Site dated July 29, 1982.

-Sylvester Hazardous Waste Dump Site Containment and Cleanup Assessment, Roy F. Weston, Inc., January 1982.

-Supplemental Study to Final Report on Sylvester Hazardous Waste Dump Site Containment and Cleanup Assessment, Roy F. Weston, Inc., July 1982.

-Gilson Road Hazardous Waste Dump Site Pilot Plant Treatment - Study Pilot Plant Design, Roy F. Weston, Inc., October 1982.

-Gilson Road Hazardous Waste Dump Site Pilot Plant Treatment - Final Report, Roy F. Weston, Inc., May 1983.

-Gilson Road Hazardous Waste Dump Site Pilot Plant Treatment - Addendum to Final Report, Roy F. Weston, Inc., June 1983.

-Gilson Road Hazardous Waste Dump Site Treatment Concerns Report, Roy F. Weston, Inc., September 1983.

-Feasibility and Cost Evaluation of Alternative Scheme for Ground Water Flow Regime Manipulation, Goldberg- Zoino & Associates, Inc, September 1983.

-Staff summary and recommendation.

Summary of Original ROD:

The original ROD was signed in July of 1982. It selected the installation of a slurry wall and a surface cap as the first phase of remedial action. The ROD approved ground water treatment as the second phase of remedial action but deferred selection of the specific treatment process until the State could complete its technical analysis and evaluation of the pilot plant studies.

Components of the Selected Treatment Process:

Ground Water Extraction and Treatment @ 300 gpm.

- Chemical precipitation of heavy metals
- pH adjustment
- Sand Filtration
- High temperature air stripping of volatile organics
- Incineration of vapors from air stripping process
- Recirculation of 250 gpm of treatment plant effluent within the slurry wall. (Recharging less water back into the containment area will induce ground water flow into the containment area through the bedrock structure.)
- Biological treatment of 50 gpm of treatment plant effluent and injection into the ground water outside the slurry wall. (Additional biological treatment is necessary because it is discharged outside the slurry wall.)
- Dewatering and on-site disposal of sludge generated from chemical precipitation and biological treatment processes*
- Operation of the system to complete the remedial action.

*Based on the pilot plant study, the sludge produced by the treatment plant will not be hazardous. However, if the sludge is found to be hazardous, it will be transported off site to an approved hazardous waste treatment or disposal facility.

Declarations:

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Oil and Hazardous Substances Contingency Plan, I have determined that the ground-water treatment action, in conjunction with previous remedial actions taken on the site, is cost effective, and provides adequate protection of the public health and welfare, and of the environment. I have also determined that the action being taken is appropriate when balanced against the need to use Trust Fund money at other sites.

I have determined that treatment of the ground water contained within the slurry wall is necessary because the leakage of contaminants under the slurry wall (through fractures in the bedrock) is expected to continue and because the long term integrity of slurry wall installation at this hazardous waste site cannot be predicted at this time.

Lee M. Thomas
Assistant Administrator
Office of Solid Waste and Emergency Response

4/22/85
Date

Sylvester Site
Staff Summary for the Supplemental
Record of Decision on Ground Water Treatment

Site Description and History

The Gilson Road hazardous waste dump site is located in the City of Nashua, New Hampshire, off Route 111, in the south easterly corner of that community. See Figures 1 and 2 for its location. The 6-acre site had been used as a sand borrow pit for an undetermined number of years. During the late 1960's, the operator of the pit began an unapproved and illegal waste disposal operation, apparently intending to fill the excavation. Household refuse, demolition materials, chemical sludges, and hazardous liquid chemicals all were dumped at the site at various times. The household refuse and demolition material were usually buried, while the sludges and hazardous liquids were either mixed with the trash or were allowed to percolate into the ground adjacent to the old sand pit. Some hazardous liquids were also stored in steel drums which were either buried or placed on the ground surface.

The illegal dumping at the site was first discovered in late 1970. After several court appearances and court actions, an injunction was issued in 1976 which ordered the removal of all materials from the site. This injunction was ignored by the operator.

The first indication that the illegal dumping had included hazardous wastes came in November 1978 when State personnel observed drums being stored at the site. A court order was issued in October 1979 prohibiting all further disposal of hazardous wastes on the site.

It is impossible to estimate the total quantities of waste materials discarded at the site. However, it has been documented that over 800,000 gallons of hazardous waste were discarded there during a ten month period in 1979.

In 1981, initial investigations showed that there were high concentrations of heavy metals and volatile and extractable organics in the ground water under the site. (See Table 1.) The contamination formed a plume in the ground water which was moving from the site toward Lyle Reed Brook at the rate of 0.8 to 1.6 feet per day.

When the volatile hazardous chemicals reach Lyle Reed Brook, they begin to volatize into the atmosphere. The rate of volatilization and exposure to the surrounding community was modeled. Based upon this analysis it was determined that volatilization of organic pollutants from Lyle Reed Brook will be well above acceptable limits. Chloroform exceeds life-time exposure levels by 100 times. Exposure from methylene chloride and ethylene chloride are high but do not exceed threshold limits.

Under the no action alternative, dilution of organic and inorganic contaminants were not sufficient to eliminate health hazards for the Lowell, Massachusetts, water system users. The arsenic concentration, which was above water quality criteria, was expected to increase by a factor of seven. The water quality criteria for methylene chloride, chloroform, 1,2-dichloro-ethane, trichloroethylene and benzene cumulatively would have been exceeded by a factor of 7.3. Also, Lyle Reed Brook would not be able to support aquatic life. In the Nashua River, concentrations were expected to approach 40 percent of the accute acceptable limits during the summer months. During periods of extreme low flow fish kills were predicted.

Due to the ground water plume migrating from the site to the Nashua River, all private drinking water wells hydraulically between these locations are unsuitable for use.

Community Relations

The public has supported the remedial actions already taken and those proposed in this Record of Decision (ROD). Local citizens have, however, urged the State to initiate action as soon as possible. EPA communicated its acceptance of the selected remedial actions at a public meeting on March 30, 1982. Approximately 150 people attended. A meeting will be held in October to review the design of treatment system with the community.

Enforcement Actions

The State has taken the lead on enforcement actions on this site. A jury awarded $14 million in a State court action. It is highly unlikely, however, that defendants in this matter have assets sufficient to satisfy the court decision. Region I has initiated a generator search to identify the generators who sent waste to Cannon's Engineering, which was the main source of waste at Nashua. The search should be completed by November 1983.

Previous Actions

During May and June of 1980, the 1314 drums which were accessible were removed by a contractor and disposed of at approved sites in New York and Ohio. This action was funded by EPA under section 311 (k) of the Clean Water Act.

In November of 1981, EPA used CERCLA emergency funds to install a ground water interception and recirculation system at the site to retard further migration of the contaminant plume until remedial action could be implemented. This system was operated until October 1982, when the slurry wall was completed.

The State of New Hampshire completed a remedial investigation and a feasibility study under the existing Cooperative Agreement

in January of 1982. They completed a supplement to that study in July of 1982, providing additional information on the costs associated with various ground water treatment rates.

A ROD was signed by the AA, OSWER in July of 1982. The activities approved in the ROD were funded through an amendment to the Cooperative Agreement.

The selected remedial action included the installation of the 20 acre slurry wall and surface cap as the first phase of the remedial action plan. The State completed construction of the slurry wall and cap in December of 1982.

The ROD also approved ground water treatment, in principle, but deferred the selection of the optimum treatment process until after the State had completed its technical analysis and evaluated the pilot plant studies.

The pilot treatment plant has now been constructed and operated for a year. Studies to determine the process train for the treatment plant were completed in June of 1983.

Current Status

The slurry wall is effectively preventing migration of contaminants contained in the overburden aquifer. However, it is not entirely preventing contamination from leaking into the fractured bedrock aquifer below the containment area and, thus, under the slurry wall. This was anticipated and is addressed in the treatment plant design by diverting part of the treated effluent (50 gpm) to ground water outside of the slurry wall. This sidestream will induce ground water flow into the slurry wall through bedrock fractures eliminating further contaminant leakage out of the containment area. The current leakage rate of 30,000 - 55,000 gpd does, however, make it important that construction of the treatment plant be started as soon as possible.

Another factor requiring rapid construction is that many of the hazardous substances inside the site are destructive to the slurry wall. Therefore, the treatment plant should be started as soon as possible to protect the effectiveness of the slurry wall.

Ground Water Treatment

The 100 gallon per minute (gpm) treatment plant proposed in the original Record of Decision was expected to require 6.2 years of operation at an annual operating cost of $750,000 and a life-cycle cost of $6,788,000. A larger plant was evaluated that would shorten the period of the remedial action. A shorter treatment period is advantegeous because it would attain the performance objectives sooner and provide better protection of the slurry wall. The resulting study found that a treatment rate of

300 gpm reduced the operating time to 1.7 years, which completes the remedial action significantly sooner at a comparable life-cycle cost of $7,097,000. The 300 gpm plant is now being recommended for implementation. Table 1 and 2 display capital and operational costs.

The estimated cost of the recommended system is comparable to the original system. The cost of both systems may ultimately be reduced by two factors that have not been included in the cost estimates: First, the equipment probably will retain substantial resale or salvage value (possibly as much as half the original purchase price after two years). Second, the current design calls for a steam turbine generator that will use waste steam to generate electricity. When that electricity is sold to the local utility, the project is expected to realize net revenues of approximately $100,000 per year. Neither of these potential revenue sources has been included in the life-cycle cost estimates for these systems.

Based on the risk assessment it was determined that the following reductions inside the containment area are necessary to adequately protect public health and the environment:

Total Organic Carbon	90%
Chloroform	95%
Methylene Chloride	90%
Benzene	90%
1,2-dichloroethane	90%
Trichloroethylene	90%
1,1,1-Trichloroethane	90%
Acetone	90%
Isopropanal	75%
Arsenic	90%

The Region I Administrator has concluded based on the Nashua feasibility studies that the concentrations remaining in the site after the treatement is stopped will not pose a substantial present or potential hazard to human health or the environment. (Analysis is attached.) The analysis used the criteria of Part 264.93 of the RCRA Land Disposal Regulations.

Volatization from Lyle Reed Creek will be reduced to acceptable exposure levels. Arsenic and organic concentrations will be reduced to below water quality criteria at Lowell, Massachusetts. The likelihood of fish kills in the Nashua River will diminish as the plume migrates into the river. Lyle Reed Brook will not meet water quality criteria levels but an expanded aquatic population is expected. Finally, all residences using ground water are threatened by the plume will be provided water service from the City of Nashua.

After one and a half to two years of operations, the treatment system will be evaluated for the following:

- o The degree to which treatment goals have been met for the ground water within the slurry wall containment area.
- o The long-term integrity of the slurry wall.
- o The amount of ground water flowing through the containment area.

We expect to attain the designated removal rates inside the containment area after two years of plant operation. This supplemental ROD approves operation of the treatment system for two years. At the conclusion of the evaluation, the State and Region I will evaluate the concentration limits and will recommend either that the treatment plant be shut down or that its operation be continued.

The basic steps of the recommended ground water treatment system are:

- inorganic chemicals removal
- volatile organic chemicals removal
- concentrated organic chemicals incineration
- biological treatment of the sidestream

The inorganic chemical removal stage is designed to remove iron and manganese from the ground water. This is necessary to prevent fouling of down stream equipment. An additional benefit of this process is the removal of some of the other heavy metals such as arsenic and lead. This step of the treatment system consists of chemical precipitation of heavy metals, pH adjustment of the waste water, and sand filtration to remove the precipitated metals sludge. A sample of the sludge has been analyzed using the standard EP-toxicity procedure and was found to be non-hazardous. Samples of the sludge from the full-scale plant will be tested. The sludge will be taken to a RCRA approved treatment or disposal facility if it is found to be a hazardous substance.

The next step in the process is the removal of the volatile organic compounds using a high temperature air stripper (HTAS). The contaminated ground water (which has had the metals removed from it in the previous process step) is preheated in two heat exchangers, an economizer and a trim heat exchanger. Over the range of operating temperatures tested, all of the priority pollutants and more than 75 per cent of the alcohols were removed from the waste water.

The vapor leaving the top of the HTAS will then go directly to a fume incinerator for the removal of the concentrated volatile organic chemicals. The incineration step of the treatment system includes a horizontal fume incinerator, using #2 fuel oil as supplemental fuel, a waste heat recovery boiler and a 250KW turbine generator. A distillation process was considered as an alternative

to incineration, but was found to be more costly and less reliable. The incineration process is a well established method for handling vapor-phase organics while avoiding operational problems in meeting stack discharge limits. The turbine generator is expected to be cost-effective for a flow rate of 300 GPM with a payback period of less than the expected operating life of the facility.

After the waste water discharged from the HTAS is split into two waste streams, the larger stream (of 250 gpm) will be directly recharged back into the contaminated area without biological treatment. The removal of the small remaining quantities of alcohols and ketones is neither necessary nor cost-effective for this stream. The side stream (of 50 gpm) will be treated using an extended aeration, activated-sludge plant. Additional biological treatment is necessary for the side stream because it is to be discharged just outside of the slurry wall to induce ground water flow into the containment area through the bedrock fractures. In addition to enhancing the water quality of the side stream, the additional removal of alcohols and ketones will avoid any possibility of damage to the outside of the slurry wall. The 50 gpm side stream is adequately treated to protect public health and is discharged on-site into less contaminated ground water just outside the slurry wall.

Design of this plant is currently nearing completion and its construction will be funded through an amendment to the Cooperative Agreement. Capital costs of the plant are shown in Table 1. Estimated operational costs to complete the remedial action are shown in Table 2.

TABLE 1

	HIGHEST CONC. FOUND IN GROUND WATER (PPB)
Vinyl Chloride	950
Benzene	3,400
Chloroform	31,000
1,1,2-Trichloroethane	17
Ethylene Chloride	73,000
Tetrachloroethylene	570
Trichloroethylene	15,000
Xylenes	10,000
Methyl Isobutyl Ketone	21,000
Methyl Ethyl Ketone	80,000
Chlorobenzene	1,100
Methylene Chloride	122,500
Toluene	29,000
Ethyl Benzene	1,200
1,1-Dichloroethane	15
t-1,2-Dichloroethane	18,000
1,1,1-Trichloroethane	2,000
Methyl Methacrylate	3,500
Ethyl Chloride	320
Tetrahydrofuran	1,500,000
2-Butanol	3,560
Dimethyl Sulfide	3,500
Diethyl Ether	20,000
Methyl Acetate	2,400
Isopropyl Alchol	26,000
Acetone	310,000

TABLE 2

ESTIMATED CONSTRUCTION COSTS

ITEM	CAPITAL COST
1. Construction of treatment building, site work, utilities, and sludge disposal site	$ 985,000
2. Chemical precipitation, neutralizaton, sludge dewatering	635,000
3. High temperature air stripping, incineration, and compliance testing	622,000
4. Extraction and recharge system	475,000
5. Package: extended-aeration, activated-sludge plant with nutrient addition to treat purge stream	340,000
6. Electrical, instrumentation, piping, and HVAC	857,000
Subtotal	$ 3,914,000
7. Contingencies (20%)	782,400
Total Capital Cost	$ 4,696,400

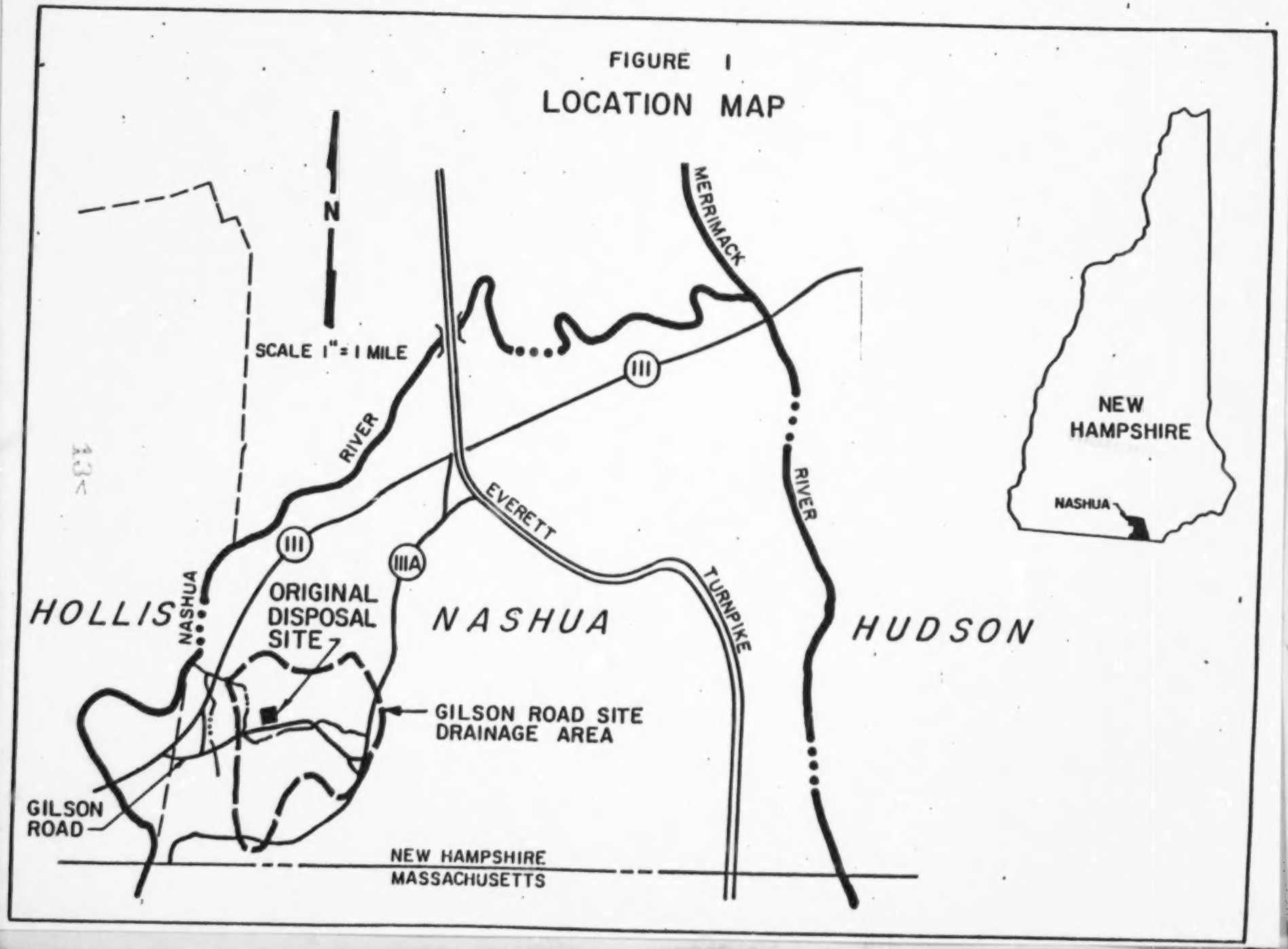
TABLE 3

ESTIMATED ANNUAL OPERATIONAL COSTS
TO COMPLETE THE REMEDIAL ACTION

ITEM	COST
1. Labor	$262,200
2. Electricity	69,000
3. Fuel Oil	883,000
4. Chemicals	96,800
5. Sludge Disposal (on-site)	41,400
6. Maintenance Materials	13,800
7. Miscellaneous (Insurance, Phones, etc.)	13,800
TOTAL	$1,380,000

FIGURE 1

LOCATION MAP



Re: Hazardous Waste Site Investigation
Sylvester Site, Gilson Road, Nashua, New
Hampshire; GHR Engineering Corp/GZA, Inc.
1981

Figure 2

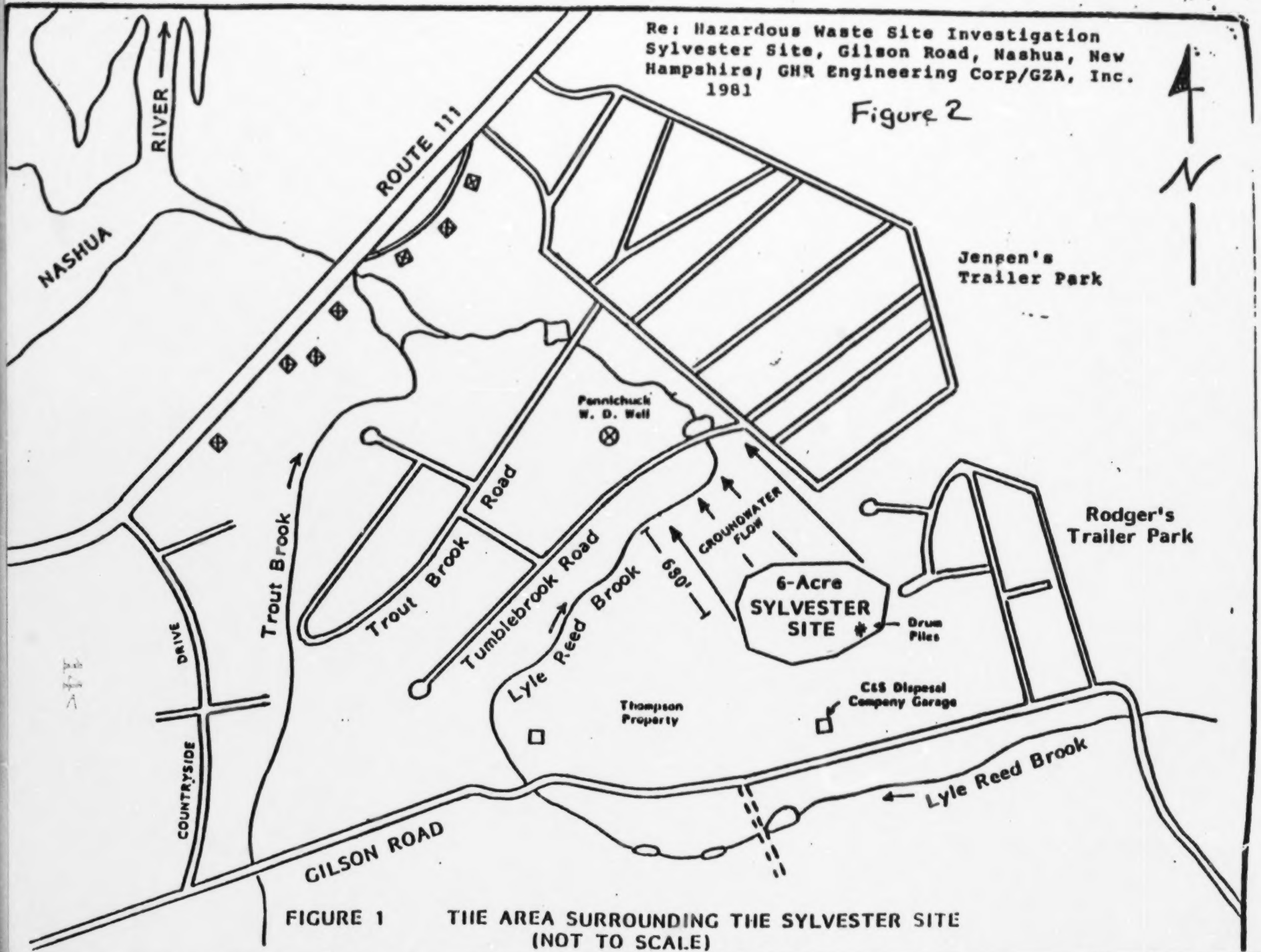


FIGURE 1 THE AREA SURROUNDING THE SYLVESTER SITE
(NOT TO SCALE)

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

DATE: September 22, 1983

SUBJECT: Transmittal of Alternate Concentration Limits for the Gilson Road Site, Nashua, NH Site

FROM: Michael R. Deland, Regional Administrator, Region I

TO: Lee M. Thomas, Assistant Administrator for Solid Waste and Emergency Response (WH-562-A) EPA, Washington, DC

I am transmitting to you alternate concentration limits for the Gilson Road site which I believe have complete technical support. I would like to point out that a comprehensive legal and programmatic review has not been initiated in the Region. It is my understanding that the issues concerning the interface with CERCLA and RCRA is currently under consideration in Washington and we have not attempted to address such issues here.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE September 21, 1983

SUBJECT Recommended Alternate Concentration Limits for the Gilson Road Site, Nashua, NH.

FROM Michael R. Deland, Regional Administrator
EPA, Region I, Boston, MA

TO Lee M. Thomas, Assistant Administrator for Solid Waste and Emergency Response (WH-562-A)
EPA, Washington, DC.

Introduction

I am recommending to you alternate concentration limits for the Gilson Road site, which I have determined to be compatible with the RCRA regulations described in the July 26, 1982 Federal Register Section 264.92 through 264.94. This determination should assist you in approving the Record of Decision dated September 22, 1983 currently awaiting your signature.

Background

The Gilson Road hazardous waste site located in Nashua, New Hampshire has received remedial action under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) since November, 1981. EPA used CERCLA emergency funds to install a ground water interception and recirculation system. This system was operated until October, 1982 when a slurry wall was completed. The State of New Hampshire developed a remedial investigation and feasibility study in January, 1982 and a supplemental study providing costs associated with various ground water treatment rates in July, 1982. A Record of Decision was signed by the AA, OSWER in July, 1982 which approved the installation of the slurry wall and pilot studies.

Upon completion of the slurry wall, a pilot treatment plant was constructed and operated for several months. The data from this pilot study resulted in a recommendation to construct a treatment plant capable of removing 90% of the hazardous constituents within the slurry wall. This design was based on evaluating the present and potential hazards to human health and environmental targets previously identified in the risk assessment portion of the feasibility study and supplement. A subsequent design modified to reduce operation and maintenance costs, but still capable of 90% removal is presently the subject of a Record of Decison dated September 22, 1983 awaiting signature by the AA OSWER. A briefing for the Director OSWER prior to the briefing for the AA OSWER surfaced the issue that a CERCLA financed ground-water treatment system should significantly reduce the level of ground-water contamination and in conjuction with the containment structure should be compatible with RCRA regulations governing ground water protection.

EPA Form 1320-6 (Rev. 3-76)

Present Situation

At this site, there are 16 hazardous constituents in the ground-water which are identified in Appendix VIII of RCRA Part 261. These hazardous constituents will be treated by the treatment process and reduced in concentration by an order of magnitude. (See Table 1). For these hazardous constituents, I am recommending the alternate concentration limits set forth in Table 1. These alternate concentration limits are consistent with the treatment design rationale which was set forth in the Feasibility Study of May, 1982 and approved in a subsequent Record of decision. These A.C.L.'s were derived from extensive technical research into the potential hazard posed by such concentrations to the human population at risk (residents at two adjacent mobile home parks) and to environmental targets identified during the risk assessment, namely Lyle Reed Brook and the Nashua River. The documents which contain the technical rationale for establishing these limits and the equivalant requirements as specified in 264.94. of the RCRA regulations are enumerated in Appendix A.

Public Participation

The NH Water Supply and Pollution Control Association actively solicited public participation and input into the decision process in establishing the alternate concentration limits. Two formal meetings were held; one in March, 1982 and another in August, 1982 to present the findings of the remedial investigation and feasibility study and to describe the various treatment schemes and results of the pilot plant study. The public reaction to the proposed treatment scheme was highly favorable including public acceptance of the long term effect of the contaminant containment and treatment. In addition, the public was made aware of all pertinent issues and the progress of remedial action through press releases, press conferences, and various mailings. At this time the public is urging rapid implementation of the chosen alternative.

Recommendation

I am recommending that these site specific alternate concentration limits set forth in this memo be accepted as compatible with the RCRA regulations and guidance governing ground water protection. These limits represent a conservative evaluation of the concentration of contaminants which may remain within the slurry wall after treatment. In actuality, the slurry wall is expected to achieve 30 to 70% reduction after treatment. The contaminants which may leave containment would leave from the lower portion of the aquifer and this will provide additional attenuation to protect Lyle Reed Brook. Alternate water supplies have been provided to the human population at risk, and the assimilative capacity of the Nashua River will further protect downstream users should the treated contaminants migrate downstream. All these safeguards further protect public health and the environment beyond the inherent protection derived from the treatment scheme.

Table I

Contaminated Concentration Within the Containment
After Treatment

Appendix VIII Hazardous Constituents	Recommended A.C.L. Within the Containment Structure
Vinyl Chloride	95 ug/l
Benzene	340 ug/l
Chloroform	1505 ug/l
1,1,2 trichloroethane	1.7 ug/l
Tetrachloroethylene	57 ug/l
Trichloroethylene	1500 ug/l
Methyl Ethyl Ketone	8000 ug/l
Chlorobenzene	110 ug/l
Methylene Chloride	12250 ug/l
Toluene	2900 ug/l
1,1 Dichloroethane	1.5 ug/l
trans-1,2-Dichloroethane	1800 ug/l
1,1,1 Trichloroethane	200 ug/l
Methyl Methacrylate	350 ug/l
Selenium	2.6 ug/l
Phenols	400 ug/l

Appendix A

RCRA Requirement in Developing A.C.L.'s	Technical Documentation
The physical and chemical characteristics of the waste in the regulated unit, including its potential for migration;	(1)(2)(4)
The hydrogeological characteristics of the facility and surrounding land;	(1)(2)
The quanity of ground water and the direction of ground water flow;	(1)(2)(4)
The proximity and withdrawal rates of ground-users;	(1)(2)
The current and future uses of ground water in the area	(1)(2)
The existing quality of ground water, icluding other sources of contamination and their cumulation impact on the ground-water quality;	(1)(2)
The potential for health risks caused by human exposure to waste consitutents:	(1)(2)
The potential damage to wildlife, crops, vegatation, and physical structures casued by exposure to waste consituents;	(1)(2)
The persistance and permanence of the potential adverse effects of hydraulically-connected surface-water quality considering;	(1)(2)
The volume and physical and chemical characteristics of the waste in the regulated unit;	(1)(2)(4)
The hydrogeological characteristics of the facility and surrounding land;	(1)(2)
The quanity and quality of ground water, and the direction of ground water flow;	(1)(2)(4)
The patterns of rainfall in the region;	(2)
The proximity of the regulated unit to surface waters;	(1)(2)

Appendix A Cont.

RCRA Requirement in Developing A.C.L.'s	Technical Documentation
The current and future uses of surface waters in the area and any water quality standards established for those surface waters;	(1)(2)
The existing quality of surface water, including other sources of contamination and the cumulative impact of surface-water quality	(1)(2)
The potential health risk causesd by human exposure to waste constituents;	(1)(2)
The potential damage to wildlife, crops. vegetation, and physical structures caused by exposure to waste constituents;	(1)(2)
The persistence and permanance of the potential adverse effects.	(1) (2)

Contained in the following Documents:

Key 1. Remedial Investigation (GHR Report)

2. Final Report. Sylvester Hazardous Waste Dump site Containment and Cleanup.

3. Supplemental report to final report.

4. Gilson Road Hazardous Waste site pilot plant treatment study.